FOOD SAFETY AND SANITATION MANUAL

SECTION 1- Microbiology

This is the most important section in this manual. A thorough understanding of this section will provide a basis for the remainder of the publication.

Foodborne disease outbreaks in the United States are caused by the following (with percent of frequency):

Bacteria - 66%
Chemicals - 25%
Viruses - 5%
Parasites - 4%

Chemicals are usually in solution and cannot be seen. Parasites involved in most outbreaks are very small and cannot be seen with the unaided eye. Bacteria and viruses are extremely microscopic. It would take millions of bacteria to produce a colony the size of the period at the end of this sentence. This amount of bacteria is more than enough to cause many people to become seriously ill.

1 A. SOURCES OF BACTERIA

Bacteria are everywhere in our environment. Most are harmless. Some are beneficial and are used to make foods, such as cheese. Others are spoilage organisms that sour and rot our food. A few become a threat to our health when they grow and reproduce. Sources of these bacteria are as follows: soil, water, air, dust, edible plants and plant products, animals and animal products, intestinal tract of man and animals, employee's hands and contaminated food utensils and equipment.

1 B. BACTERIA IN FOOD

A common misconception is that food is free of bacteria that cause foodborne diseases when it reaches the establishment or after processing. The following information suggests otherwise.

Red Meats. Concentrations of two types of foodborne disease organisms were found in 28% of pork sausage. Fresh ground beef in a recent study was found to contain three types of foodborne disease organisms.

Poultry. Poultry represents an important source of foodborne disease organisms. In one study 90% of the market-ready chicken and turkey were contaminated with foodborne disease bacteria. In another study more than half of the poultry samples harbored two types of foodborne disease bacteria.

Seafood. The incidence of foodborne disease organisms in shellfish depends greatly upon the quality of water from which animals are harvested and handled. In one study, 47% of clams, mussels, and oysters were positive for enteroviruses. In another study, 33% of the seafood tested positive for organisms of salmonellosis.

Dairy Products. Milk is of little risk because it is pasteurized. However, postpasteurization contamination and adding ingredients to milk increases potential for outbreaks. Twenty percent of some cheeses are contaminated with disease bacteria. Unpasteurized dairy products present greater risk. Raw milk tested positive for a common disease organism in 48% of the samples taken.

Deli Foods. More than 95% of retail salads (chicken, egg, ham, macaroni, shrimp, etc.) in a recent survey were contaminated with low levels of a common foodborne disease organism. Sixty percent of sandwiches were found contaminated.

Dry Products. In a survey of dry sauce and gravy mixes, soup mixes, spaghetti sauce mixes, and cheese sauce mixes, 18% were contaminated with foodborne disease organisms.

Grains. Grains and granary products are commonly contaminated with bacteria. In one study, 100% of raw rice was contaminated with a foodborne disease organism.

Bakery Products. The surface of freshly baked bread products are practically free of microorganisms, but they are subject to contamination from the air during cooling and during handling. Filled pastries present much greater risk.

Vegetables. Raw vegetables are commonly contaminated with bacteria from the soil. For example, botulism causing bacteria were found in 12% of frozen spinach in one study. In another study, 46% of raw vegetables were contaminated with another foodborne disease organism. In another study, 26% of the fresh potatoes and 30% of fresh radishes tested positive for Listeria organisms.

1 C. HUMAN BACTERIA

Another common misconception is that healthy employees do not harbor bacteria. Humans have their own natural population of bacteria (part of the normal flora), and some are the variety that cause foodborne diseases. At least 80% of the population are carriers of bacteria that cause Clostridium perfringens food poisoning. Also, 30 to 50% of the population have staphylococcal food poisoning organisms in their nasal passage or on their skin. Of course, sick employees are carriers of great numbers of organisms that cause disease.

1 D. FACTORS INFLUENCING BACTERIAL GROWTH

Bacteria have specific nutritional and environmental needs in order to survive and reproduce. They are as follows: food, moisture, proper atmosphere, pH, temperature, and inhibitory substances.

Food. Bacteria have various food preferences. Those of public health concern like the same kinds of food we like.

Moisture. There must be adequate moisture for bacteria to grow. The amount of moisture needed is defined by the term water activity (a_w). Fresh beef with a high a_w (0.99) will support rapid bacterial growth. However, cured beef jerky with a lower a_w (less than 0.85) will not.

Atmospheric Requirements. Some bacteria grow rapidly only in the presence of free oxygen; others require the absence of oxygen; some grow in both atmospheres and even others may have special atmospheric requirements. Cooking drives off oxygen; stirring, mixing, and beating foods introduce oxygen.

pH. The pH of the bacteria's environment is a measurement of the degree of acidity or alkalinity. The scale is 0 - 14. Most foods occupy the pH scale from 2.3 (which is acidic) to 8.0 (which is slightly alkaline). A pH of 7 is neutral. Most bacteria of public health concern grow best at pH values between 4.6 to 7.5. Examples of food pH are as follows (in decreasing order of acidity): lemons, 2.3; vinegar, 3.0; tomatoes, 4.2; bread and ground beef, 5.5; ham, 6.0; corn, 6.3; chicken, 6.4; milk, 6.5; fish, 6.8; pure water, 7.0; and egg white, 8.0. Mixing foods of different pH changes the pH of the mixture.

Temperature. Some spoilage bacteria grow best at refrigeration temperatures. Some others grow best at temperatures above 120°F. Those of public health concern grow best between 60° and 120°F.

I**nhibitory Substances**. Inhibitory substances from bacteria themselves, or as a natural ingredient of food or added during food processing may slow down, stop or inhibit growth of some bacteria or enhance the growth of others. Salted ham is a good example. Because of the salt concentration, spoilage bacteria growth is inhibited. However, the condition supports the growth of a common food poisoning bacteria.

It is important to understand these things in order to appreciate what influences bacterial growth, or why some foods support bacterial growth in one form but not in another.

1 E. BACTERIAL GROWTH

Bacterial growth refers to the increase in number of organisms. This is accomplished by cell division, whereby the bacterial cell splits to form two cells.

Bacterial growth can be very rapid but not until conditions are just right. There are four phases bacteria goes through. It is important to understand what takes place at each phase of the bacterial growth curve.

Lag Phase. When bacteria are introduced to food, there is an adjustment or lag period. During this time there is considerable biochemical activity but no increase in the number of cells. The lag phase can be from a few hours to days.

Log Phase. When conditions are right, rapid growth commences. This is called the log or logarithmic phase because the bacteria double their number by cell division, some at a rate of every 20 minutes. This is generally not appreciated until it is graphically illustrated, like in the following example:

Example of Logarithmic Growth Rate

Time	Number	Time	Number
Start	216	2'20"	27,648
20"	432	2'40"	55,296
40"	864	3'00"	110,592
1'00"	1,728	3'20"	221,184
1'20"	3,456	3'40"	442,368
1'40"	6,912	4'00"	884,736
2'00"	13,824	4'20"	1,769,472

The above example demonstrates how starting with 216 bacteria and with a 20 minute doubling rate, after 4 hours, 20 minutes there would be over 1 million bacteria.

Stationary Phase. After a period of rapid growth, bacteria numbers reach the leveling-off stage as nutrients are used up and waste accumulates. Foods at this level and beyond are usually "spoiled" because of the bacterial activity and are generally unacceptable from a purely organoleptical viewpoint (flavor, aroma, appearance).

Death Phase. At this point, the food is no longer suitable for supporting growth and the bacteria die.

1 F. INTERESTING INFORMATION ABOUT FOODBORNE DISEASE CAUSATIVE AGENTS

Bacteria

- No foodborne disease bacteria will grow when temperatures reach freezing, but many survive. Most bacteria grow slowly at refrigeration temperatures (45°F or less), and growth rate increases with increased temperature. Good growth occurs at room temperature (about 70°F). Fastest growth for most bacteria occurs between 90° and 100°F. Several bacteria types survive higher temperatures, and a few can tolerate boiling for a short period of time.
- As few as two salmonellosis bacteria/teaspoonful of milk is sufficient to cause the disease. To cause some other foodborne diseases, as many as five million bacteria/teaspoonful or more may be required. Some bacteria concentrations in contaminated food may be 50 million or more/teaspoonful.

- Some foodborne disease bacteria form spores (protective shells) when conditions are not suitable for growth. These bacteria can live for a long time in the spore stage in dry conditions, at adverse temperatures and during exposure to some chemicals. When conditions are suitable again, the bacteria grow.

- Some foodborne disease bacteria do not grow very well when other competitive bacteria (such as spoilage bacteria) are present. Cooking food kills spoilage bacteria in the food and contributes to the growth of foodborne disease bacteria.

- Some bacteria produce a toxin (poison). Cooking the food may kill the bacteria but will not destroy the toxin. However, botulism toxin is destroyed at 176°F for 10 minutes or boiling for a few minutes.

Viruses

- Unlike bacteria, viruses do not grow in food. Food only serves as a vehicle from the source of contamination to the consumer. The primary contamination source is man, either directly or indirectly.

- The two viruses commonly attributed to foodborne disease outbreaks are hepatitis A and Norwalk virus. Contaminated shellfish, uncooked foods and foods contaminated after cooking have contributed to a considerable number of hepatitis A outbreaks. Outbreaks of the Norwalk-like virus in uncooked foods is increasing throughout the nation. It is more resistant to destruction than hepatitis A virus.

Parasites

- The most common parasite involved in foodborne disease outbreaks is the trichinosis nematode. The disease is acquired from consuming raw or improperly cooked meat (primarily pork).

- Other less common parasites that are found in, or transmitted by, food are protozoans that cause giardiasis and amebiasis. Infected persons transmit the organisms to food via not washing their hands after using the restroom.

Chemicals

- Food accounts for 80-90% of the total human exposure to most chemicals from environmental sources. Fish poisoning (ciguatoxin and scombrotoxin) accounts for most of the reported outbreaks. Scombroid poisoning is most often a result of histamine production in fish which have been improperly refrigerated.

- Heavy metal poisoning occur frequently when acid foods (such as lemonade) and carbonated beverages come in contact with such heavy metals as copper, zinc, antimony and cadmium.

1 G. SUMMARY

- Bacteria are so small that thousands in one spot cannot be seen with the unaided eye.
- Bacteria are everywhere. Most are harmless, some are beneficial and a few cause disease.
- Fresh foods may contain disease-causing bacteria.

- Three of the most essential requirements for bacterial growth are food, moisture and temperature.
- Bacterial growth is accomplished by cell division.
- When conditions are just right, bacterial growth can be very rapid and in a few hours the number can be in the millions.
- Foodborne disease bacteria will not grow at freezing, but some grow at refrigeration temperatures, many grow at room temperature, and the greatest growth is between 90° and 100°F.
- With some foodborne diseases, ingesting only two organisms is enough to cause illness. For others, thousands or millions of organisms are required.
- Some bacteria form spores and can live a long time when growth conditions are not just right.
- Viruses do not grow in food. Man is the source of contamination.
- The trichinosis nematode is the most important parasite. It is found in meat not properly cooked.
- Improperly refrigerated fish can become toxic.
- Lemonade in a copper container can become toxic.

SECTION 2 - Foodborne Disease Outbreaks

Foodborne disease organisms and occasionally toxins and chemicals enter every food establishment, probably every day. Therefore, the supervisor needs general information about these unwelcome visitors. This section is to address that need.

2 A. IDENTIFICATION OF DISEASE ORGANISMS

Important foodborne disease organisms, toxins and chemicals and their affect on public health are identified in the chart contained in this section. The following comments pertaining to the chart are important:

Causative Agent. Unfortunately, most of the diseases and the organisms that cause them (or causative agents) do not have easy-to-remember names. The reason is, they are technical names created by scientists. Although it is not necessarily important to be able to pronounce them, it is important to be able to associate a name with a particular disease.

Incubation time. Incubation time is the time period from ingestion of the organism, toxin or chemical to the time symptoms start.

Onset Time. Onset time is the time that symptoms start.

Symptoms. Most symptoms are understandable. Less common terms are explained in the glossary.

2 B. FOODBORNE DISEASE OUTBREAK

When people ingest foodborne disease organisms, toxins or chemicals, an outbreak often occurs. Therefore, it is important to know the **definition of a foodborne disease outbreak**. It is defined as follows:

A. Two or more persons experiencing a similar illness, usually gastrointestinal, after eating a common food.

B. Epidemiologic analysis implicates food as the source of illness.

C. One case of botulism or chemical poisoning constitutes an outbreak.

2 C. OCCURRENCE OF FOODBORNE DISEASE OUTBREAKS

Of the places identified, the frequency of foodborne disease outbreaks in the United States is as follows (percent frequency in parentheses):

- Restaurants, cafeterias, delicatessens and other commercial food establishments (57%)
- Homes (29%)
- Schools (6%)
- Church functions (3%)
- Picnics (3%)
- Camps (2%)

Because many foodborne disease outbreaks are not recognized or just considered "a bug that's going around," many foodborne disease outbreaks go unreported. It is estimated that the actual number of outbreaks is 10 to 100 times more than reported.

2 D. FACTORS CONTRIBUTING TO OUTBREAKS

Investigations of foodborne disease outbreaks have revealed the following as the most important contributing factors (percent frequency in parentheses):

- Improper holding temperatures (34%)
- Poor personal hygiene (18%)
- Inadequate cooking (15%)
- Contaminated equipment (14%)
- Food from unsafe source (9%)
- Other (10%)

2 E. ECONOMIC IMPACT OF OUTBREAKS

Although the full economic impact of foodborne diseases has not been measured, preliminary reputable studies estimate that the 12.6 million annual cases in the United States cost $8.4 billion. The number of cases and cost are continuing to rise. The chart includes the annual number of cases and the average cost per case.

2 F. RECENT IDAHO FOODBORNE DISEASE OUTBREAKS

The following outbreaks represent a few that have occurred in Idaho recently:

- 650 persons became ill after eating at a Moscow restaurant. Salad bar lettuce contaminated with a viral agent was the suspected cause.
- 11 confirmed cases of salmonellosis were attributed to a foodborne disease outbreak at a Kootenai County truck stop. It is suspected that poor food handling practices by the employees caused the outbreak.
- 165 persons became ill after eating a catered meal at a Boise athletic club. It is suspected that sick food handlers contaminated coleslaw during preparation.
- 33 persons became ill after eating a catered meal at a McCall business meeting. It is believed that the food handler contaminated the food with a viral agent.
- A number of people became ill after eating the "daily special" at a Butte County restaurant. Ham and stool samples of two ill persons were positive for the same food poisoning organism.
- 11 people attending a southeastern Idaho movie theater became ill after drinking carbonated fountain drinks contaminated with copper from the water line.
- 8 people attending a wedding reception became ill after eating deli foods prepared by an employee with an infected hangnail.

2 G. SUMMARY

- Foodborne disease organisms and occasionally toxins and chemicals enter every food establishment probably every day.
- The onset time, symptoms and severity of foodborne diseases vary depending on the causative agent.
- A foodborne disease outbreak is generally identified by two or more persons experiencing a similar illness after eating a common food.
- Restaurants, cafeterias, delicatessens and other commercial food establishments cause more than half of the foodborne disease outbreaks.
- The three most important factors contributing to outbreaks are improper holding temperatures, poor personal hygiene, and contaminated equipment.
- It is estimated that 12.6 million cases of foodborne diseases occur in the United States each year at a cost of $8.4 billion.
- Recent examples of Idaho outbreaks suggest that Idaho food establishments are not immune from outbreaks.

2 H. IMPORTANT FOODBORNE DISEASE ORGANISMS, TOXINS AND CHEMICALS OF PUBLIC HEALTH SIGNIFICANCE

Disease/Causative Agent	Onset Time	Symptoms	Common Food	Contributing Factors*	Duration/Annual US Cases/Average Case Cost
Staphylococcal Food Poisoning	2-4 hours	Abrupt onset of severe nausea,	Poultry and meat products, egg	1, 3, 5	Usually Less than 24 hours

Staphylococcus aureus	(2 - 7)	cramps, vomiting, malaise	and potato salads, sauces, dairy products, cream filled baked products		1,200,000 cases $1,310
Salmonellosis Salmonella spp.	12-36 hours (6 - 72)	Sudden onset of abdominal pain, fever, nausea, diarrhea; sometimes vomiting	Poultry and meat products, eggs, milk, melons, chocolate	1, 2, 3, 5	Several days 3,000,000 cases $1,350
Clostridium perfringens Food Poisoning	10-12 hours (6 - 24)	Abdominal cramps and watery diarrhea; sometimes with nausea, vomiting and fever	Meats, poultry, soups, gravies, sauces, stews, casseroles	1,2	Usually less than 24 hours 650,000 cases $190
Botulism Clostridium botulinum	12-36 hours (2 - 140)	Blurred or double vision, dysphagia, dry mouth, vomiting, constipation or diarrhea	Improperly processed, canned, low-acid or alkaline foods; cooked vegetables in oils or butter; foods out of refrigeration in air-tight packages	1, 2, 6	2 - 8 months 270 cases $322,000
Bacillus cereus Food Poisoning	1-24 hours	Nausea and vomiting for emetic phase, abdominal cramps and diarrhea for diarrheal phase	Rice dishes and pasta products; meat products, soups, vegetables, puddings, sauces	1	Usually less than 24 hours 650,000 cases $190
Shigellosis Shigella spp.	24-72 hours (12 - 96)	Abdominal cramps, watery diarrhea (may contain blood and pus), fever, nausea	Meats, shellfish, vegetables, salads, water	1, 5	4 - 7 days 163,000 cases $390
Escherichia coli 0157:H7 Food Poisoning	4 days (3 - 9 days)	Abdominal cramps, watery diarrhea which later becomes grossly bloody; sometimes vomiting	Ground beef, raw milk, any foods handled by infected person	2, 5	2 - 9 days number of cases undetermined cost undetermined
Listeriosis Listeria monocytogenes	3 - 70 days	Mild to moderate flu-like symptoms - fever, intense headache, nausea, vomiting; abortions and stillbirths in pregnant women	Contaminated meats, dairy products and vegetables	1, 3, 5	Duration variable 25,000 cases $12,500
Campylobacteriosis Campylobacter spp.	3 - 5 days (1 - 10)	Nausea, vomiting, abdominal pain, diarrhea, fever, malaise	Meats, poultry, milk	1, 3, 4	1 - 2 weeks 170,000 cases $920
Viral Hepatitis A	28 - 30 days	Onset abrupt with fever, malaise,	Shellfish, sandwiches,	5	2 - 6 weeks

	(15 - 20)	anorexia, nausea, abdominal discomfort, dark urine, jaundice	salads, other foods handled by infected person		35,000 cases $5,000
Viral Gastroenteritis Norwalk Virus	16-48 hours (5 - 72)	Nausea, fever, abdominal cramps, vomiting, watery diarrhea	Shellfish, any foods handled by infected person	1, 4, 5	24 - 48 hours 181,000 cases $890
Scombroid Poisoning Histamine-like substances	1 minute - 3 hours	Flushing, dizziness, headache, burning mouth and throat, vomiting, diarrhea	Tuna, mackerel, bluefish, skipjack, bonito, blue dolphin and related fish	1, 4	Recovery within 24 hours 31,000 cases $970
Heavy Metal Poisoning Antimony, cadmium, copper, zinc, etc.	Few minutes - 2 hours	Nausea, vomiting, abdominal cramps, diarrhea	High-acid foods and beverages	3, 6	Recovery within 24 hours 96,000 cases $300

*Most common, as established by CDC: 1) Improper holding temperatures; 2) Inadequate cooking; 3) Contaminated equipment; 4) Food from unsafe source; 5) Poor personal hygiene; 6) Other

SECTION 3 - Food Sources and Protection

Foods can be placed in two general classes depending on their ability to cause foodborne diseases - potentially hazardous foods and non-potentially hazardous foods. It is very important to know what foods are potentially hazardous. It is essential that potentially hazardous foods are obtained from approved sources and stored properly to prevent cross-contamination.

3 A. POTENTIALLY HAZARDOUS FOOD

A potentially hazardous food is any food **or ingredient** that will support the rapid growth of harmful bacteria. **Some examples** are as follows:

- Any food of animal origin - All meats (red meat, poultry, fish, shellfish, crustaceans, etc.), eggs, milk and dairy products;
- Any food of plant origin that has been heat treated and has a history of foodborne disease - potatoes, squash, pumpkin, rice, refried beans, mushrooms, onions, tofu; any untreated food of plant origin with a history of foodborne disease - seed sprouts, cut melons, tightly wrapped produce such as mushrooms and coleslaw; and
- Synthetic foods (unless laboratory evidence proves otherwise) - artificial cream filling.

Exceptions to the above are as follows:

- Air-dried hard-boiled eggs with shells intact;
- Food with low water activity (0.85 or less) - jerky, powdered milk, hard cheeses, etc.;
- Foods with a pH of 4.6 or less - some commercially prepared dressings, pickled meats and vegetables;
- Unopened containers of food which have been processed to maintain commercial sterility; and
- Foods, both natural and synthetic, for which laboratory evidence demonstrates that growth of harmful bacteria will not occur.

3 B. FOOD SOURCES

Food safety starts at the door of the food establishment when food supplies are received. **Do not accept foods from unapproved sources or which are unsafe, adulterated or out of temperature**.

Give special attention to the following:

Wholesomeness Check. Check all incoming foods for damaged containers, leaks, off-odors, filth and other signs that suggest food may not be wholesome.

Packaged Foods. Generally, foods commercially packaged and properly labeled are from approved food processing establishments. Reputable establishments are regulated by federal or state agencies to ensure the safety of the product. **Do not receive or use packaged food without labels**. Salvaged packaged foods must be marked "Salvage."

Milk and Milk Products. Only pasteurized milk and milk products can be received and used. The only exception is the retail sale of packaged raw milk products to consumers only.

Eggs. Eggs and egg products must be from a regulated egg producing or processing establishment.

Do not accept or use cracked, checked or dirty eggs. Ungraded eggs can be sold at retail to the consumer only.

Shellfish. Shellfish must be obtained in containers bearing proper labeling with a certification number.

Meat. All meat and meat products must be from regulated meat processing establishments and must be inspected for wholesomeness (unless exempted by law).

Produce. Most produce from warehouses is from approved sources. Occasionally, produce from a local source is obtained. Care should be taken to ensure that produce from a local grower has not been mishandled or contaminated.

Other Foods. Crustaceans, wild mushrooms, wildlife and other foods not mentioned above must also be from approved sources.

Home-canned and Home-prepared Food. Foods canned or prepared in a private home or unregulated food establishment are not from approved sources. **Do not accept or use these foods**. Such foods may present a risk to public health.

3 C. RECEIVING TEMPERATURE

To ensure food safety, **frozen foods need be received frozen and potentially hazardous foods need to be received at 45°F or below or 140°F or above** (fresh eggs may be received at 60°F or below).

3 D. PROTECTION FROM CROSS-CONTAMINATION

All food, while being stored, prepared, displayed, served or sold in food establishments or transported need to be protected against cross-contamination.

The following provides important information and requirements as applicable to critical items:

Separation of Animal Species. Raw meat of all types of animal products (beef, fish, lamb, pork, poultry, etc.) must be physically separated during transportation, storage and processing. This is required because different meats have different bacteria and parasite types and numbers. Normally, beef and lamb have the least and poultry has the most. This requirement is particularly important considering different preparation methods and cooking temperatures for the different products. Also, where custom meat processing is done, these meats must be stored and processed separately from inspected meats.

Separation of Ready-To-Eat Foods. Ready-to-eat food (including cooked food) must be physically separated from unwashed produce and uncooked food products during storage, preparation, holding, transportation and/or service. Physical separation can be vertical - ready-to-eat food located above unwashed produce and uncooked food products, but not below.

Separate Storage Areas for Unusable Foods. Separate storage areas must be provided for spoiled, returned, damaged or unwholesome food in order to prevent cross-contamination.

Ice Protection. Ice intended for human consumption cannot be used for other purposes prior to consumption. One exception is food ice for cooling tubes.

Re-serving Food Prohibited. Food, once served to the consumer, must not be served again (some exceptions).

Preparation of Ready-To-Eat Foods. Ready-to-eat foods must not be prepared in areas where raw meats are processed, except by scheduling and proper cleaning between operations.

Avoiding Unsafe Additives. Foods must be protected against contamination resulting from the addition of unsafe or unapproved food, color additives, steam, gases and air.

Avoid Egg Pooling and Contamination. Fresh eggs should not be cracked in quantity and pooled. Use pasteurized eggs. Do not use raw eggs in ready-to-eat food products.

Protection of Bulk Foods. Prepared food, once removed from the original package or container, regardless of the amount, must not be returned. This also applies to consumer self-service displays, salad bars, etc.

Avoiding Contamination from Gloves. When using gloves, always handle ready-to-eat products before non-ready-to-eat products. Then handle, if necessary, raw foods in descending order of potential contamination as specified in the **UNICODE**. Never reverse the food handling procedure. **Gloves present no special protection against cross-contamination**.

3 E. CROSS-CONTAMINATION EXAMPLES

Some classic examples of potential cross-contamination in Idaho food establishments are as follows:

- During the process of cutting chickens on a meat band saw, the operator cut a bologna to order on the same equipment.
- A food handler placed a cooked turkey for carving on the unclean surface where the turkey was previously placed during preparation when raw.
- Blood from thawing liver overhead dripping into a container of strawberry gelatin salad.
- Spoiled dairy products for salesperson pickup placed over ready-to-eat foods in a walk-in refrigeration unit.
- Ready-to-eat crab salad located in refrigerated display case next to raw sausage.
- A school kitchen worker used the same spoon to stir food being prepared for cooking and ready-to-eat food being prepared for the serving line.

3 F. SUMMARY

- Potentially hazardous foods are foods or ingredients that will support rapid growth of harmful bacteria that cause foodborne disease.
- Many foods used by food establishments are potentially hazardous.
- All foods must be obtained from approved sources. Home-canned and home-prepared foods are not approved.
- All incoming foods should be checked for wholesomeness.
- Frozen foods must be received frozen and potentially hazardous foods received at 45°F or below or 140°F or above.
- All foods, while being stored, prepared, displayed, served or sold in food establishments or transported need to be protected against cross-contamination.
- Cross-contamination occurs when raw potentially hazardous foods or soiled or adulterated foods contact or drip on other foods.
- Gloves present no special protection against cross-contamination.

Reference: **UNICODE** Sections 100 and 200

SECTION 4 - Destruction of Organisms

We often do not give a lot of thought to the fact that certain methods of food preparation is actually for the purpose of destroying bacteria and other pathogenic organisms.

4 A. COOKING

It is generally recognized that food is cooked to increase palatability, to tenderize, to change the character of the food, for cultural reasons or just to make it hot. However, an important reason to cook some foods is to destroy organisms that cause disease. Proper cooking is often the "critical control point" in preventing foodborne disease outbreaks.

The following cooking temperatures for specified food will either kill dangerous organisms outright or injure them sufficiently that there is little risk, if the food is eaten promptly after cooking:

- Poultry and stuffed foods - 165°F or above.
- Ground beef - At least 155°F.
- Fish, lamb, eggs, beef (other than ground beef), and unspecified meats - 145°F or above.
- Rare beef roasts - At least 130°F.

Microwave Cooking. When cooking with a micro-wave oven, food must be rotated during cooking to compensate for uneven heat distribution and heated an additional 25°F to compensate for the shorter cooking time.

Food Processing. Cooking as a food processing method must be done to obtain commercial sterility and/or in accordance to specified good manufacturing practices. Smoking of meat must be done during the cooking process or at a temperature of at least 140°F.

Cooking Stuffing. Stuffing placed in an animal's body cavity for cooking must be cooked to at least 165°F. The number of foodborne outbreaks due to undercooked stuffing in poultry necessitates this requirement.

4 B. REHEATING

Potentially hazardous foods that have been cooked and then refrigerated and which are to be reheated for hot holding must be reheated so all parts of the food reach **165°F within two hours** (unsliced beef roast - 130°F). Proper reheating is very important in order to destroy the increased number of dangerous organisms in the food since cooking.

NOTE: Steam tables, bainmaries, warmers, and similar hot food holding facilities cannot be used for reheating purposes.

4 C. FREEZING

Fishery products which are not thoroughly cooked and are intended for raw, marinated or partially cooked consumption must be **blast frozen to at least -31°F for 15 hours or conventionally frozen to -4°F for 168 hours (7 days)** in order to kill parasitic worms in the flesh.

THERMOMETER

The thermometer is the most important tool for the food industry. Almost every aspect of the food business - from the source to the consumer - has temperature requirements.

Proper cooking temperatures are very important. The thermometer used for checking temperatures must be an approved type. The **UNICODE** requires a metal or plastic stem type

thermometer which is numerically scaled and accurate to plus/minus 2°F. Also, the thermometer must be located adjacent to operations requiring frequent temperature monitoring.

To check cooking temperatures, place the thermometer in the center of the food or the portion of the food that has the greatest density.

Calibration Procedure for Thermometers. It is important that the thermometer you use for checking food temperatures is properly constructed and **has been recently checked for accuracy** (plus/minus 2°F) (500.12). You can check your thermometer's accuracy by using the ice point/boiling point calibration method.

For ice point calibration, use crushed ice with enough water to make a slush for maintaining the ice point temperature. Stir continuously. Do not let the thermometer stem or sensing element touch the bottom or sides of the container. Allow the thermometer to reach equilibrium, and then read the temperature. The temperature should read 32°F.

For boiling point calibration, make sure the water is a "rolling" boil. Since water boils at different temperatures at different elevations, it is important to know the elevation of your city or community.

BOILING POINT FOR SPECIFIC IDAHO LOCATIONS

LOCATION	ELEVATION	BOILING POINT
Lewiston	738 ft	211°F
Coeur d'Alene	2,187 ft	208°F
Caldwell	2,365 ft	208°F
Wallace	2,744 ft	207°F
Boise	2,842 ft	207°F
Twin Falls	3,745 ft	205°F
Salmon	4,004 ft	205°F
Pocatello	4,460 ft	204°F
Idaho Falls	4,730 ft	203°F
McCall	5,030 ft	203°F
Stanley	6,260 ft	201°F
Macks Inn	6,405 ft	200°F

Boiling points of other localities in Idaho can be approximated from the examples provided. The thermometer should read within one degree of the boiling points for the specific elevation.

IMPORTANT: THERMOMETERS WHICH ARE INACCURATE SHOULD BE PROPERLY ADJUSTED OR REPLACED. Should you have a problem with your thermometer's accuracy, contact your supervisor.

4 D. SUMMARY

Ensure the destruction of bacteria and parasites by adherence to the following:

- Cook foods to proper temperature.
- Check food temperatures often with an approved thermometer.
- Fishery products not to be properly cooked need to be adequately frozen before service.
- Check thermometers often for accuracy.

Reference: **UNICODE** Sections 300 and 500.12

SECTION 5 - Limitation of Growth of Bacteria

5 A. EFFECTS OF TEMPERATURE ON BACTERIA

Because of the unique survival capabilities of bacteria, it is important to limit their growth in food as much as possible. Their growth potential is shown in the following table:

EFFECTS OF TEMPERATURE ON BACTERIA		
Commercial canning temperatures (can only be obtained under pressure)	250°F	Food products essentially sterile. *C. botulinum* spores destroyed. *S. aureus* toxin not inactivated at these temperatures.
	240°F	
Water boils	212°F	Spores of *C. botulinum* and *C. perfringens* can survive for hours. Toxin of *C. botulinum* inactivated.
	165°F	Most bacteria die; some spore-forming bacteria survive.
	140°F	No bacteria growth; some survive.
DANGER ZONE	139°F	
Hottest temperature hands can endure	125°F	Some bacterial growth; many survive.
Body temperature	98.6°F	Greatest bacterial growth and toxin production by some.
	70°F	Rapid bacterial growth and toxin production by some.
Room temperature ***Keep food safe:*** ***140°F or above OR 45°F or below***	46°F	
	45°F	Some bacterial growth.
Water freezes	32°F	No bacterial growth; many survive.
	0°F	Slow death for many bacteria; some survive.

Limiting bacterial growth is done by a time-temperature control process. This process is critical during thawing, holding, preparation, cooling and during the transportation of foods.

Thawing. Potentially hazardous foods must be thawed as fast as possible to limit bacterial growth during the process.

The following methods of thawing potentially hazardous foods are acceptable:

- Under refrigeration;
- Under running water 70°F or less with sufficient water flow; or
- As part of a continuous cooking process.

Thawing at room temperature is not acceptable.

Holding. Potentially hazardous foods must be held outside of the bacteria optimum growth temperature zone (**DANGER ZONE**), which is 45°F to 140°F. Remember:

- **HOT HOLDING - 140°F OR ABOVE**

- **COLD HOLDING - 45°F OR BELOW**

Potentially hazardous foods held in the danger zone for **MORE THAN 4 HOURS** are considered adulterated and may cause a foodborne outbreak if consumed.

Frozen food must be held in the frozen state in such a manner to preclude thawing.

Preparation. Potentially hazardous ingredients for foods that will be consumed without further cooking (salads, sandwiches, filled pastry products, etc.) and reconstituted and fortified foods must be pre-chilled to **45°F OR BELOW** prior to preparation. Failure to do so may contribute to increased bacterial growth.

Cooling. Cooling food must be very important because improper cooling is the **NUMBER ONE** cause of foodborne disease outbreaks. The main consideration is cooling food fast enough so bacteria will not have enough time to multiply sufficiently to cause a problem.

Potentially hazardous food must be cooled from **ANY TEMPERATURE BELOW 140°F TO 45°F OR BELOW WITHIN 4 HOURS**. The following cooling procedures are important:

- Place food in shallow pans or containers in order to reduce the volume and/or increase the surface area, and breaking the food down into smaller or thinner portions. The following example of water cooling gives importance to this requirement:

  HOW LONG TO COOL WATER from 140°F to 45°F
  under refrigeration in 12" stockpot

  2" Deep = 2 Hours
  8" Deep = 32 Hours

- Stirring food in a container placed in an ice water bath.

- Using rapid chilling equipment. **HOME-STYLE EQUIPMENT IS NOT SUITABLE FOR THIS PURPOSE**.
- Arrange containers in refrigeration equipment for maximum heat transfer. Do not stack cooling containers or put them close together.
- Loosely cover during the cooling period to allow air circulation in the container.

Transportation. The same temperature considerations mentioned above also apply when potentially hazardous foods are being transported.

Facilities. In order to ensure proper food temperatures, sufficient temperature controlling equipment must be provided.

5 B. CHECK TEMPERATURES OFTEN

Food temperatures cannot be accurately determined by touching the container with the hand. Just a few degrees in the "danger zone" is enough to allow some disease bacteria to grow. Use a metal or plastic stem thermometer to check food temperatures. **Use it often**.

5 C. SUMMARY

Limit bacterial growth in potentially hazardous foods by adherence to the following time-temperature control processes:

- Thaw potentially hazardous foods under refrigeration, running water or during cooking process.
- Keep potentially hazardous foods 140°F or above or 45°F or below.
- Cool potentially hazardous foods rapidly.
- Use prechilled ingredients for potentially hazardous foods not requiring cooking.

Check temperatures often with an approved thermometer.

Reference: **UNICODE** Section 320

SECTION 6 - Employee Health and Hygiene

Employee health and hygiene, directly or indirectly, plays an important role in food safety and sanitation. Sick employees and poor hygienic practices rank **SECOND** in the causes of foodborne disease outbreaks.

Direct employee sources of foodborne disease organisms are the following:

- Sick employees
- Normal flora
- Transient microorganisms

6 A. SICK EMPLOYEES

Man is subject to a number of communicable diseases that contribute to food contamination. These are listed in **Idaho Reportable Diseases**, which is a regulation of the Idaho Department of Health and Welfare. Specifically, the diseases and conditions of concern are the following:

- Amebiasis
- Campylobacteriosis
- Cholera
- Diarrhea (until common communicable causes have been ruled out)
- Diphtheria
- E. coli 0157:H7
- Giardiasis
- Hepatitis A
- Salmonellosis
- Shigellosis
- Staphylococcal skin infections
- Streptococcal skin infections
- Taeniasis
- Active tuberculosis
- Vomiting (until non-infectious cause is identified)

Because of the potential communicability of these diseases and conditions, the following requirement must be strictly followed at all times:

IDAHO HEALTH RULES AND REGULATIONS PROHIBIT ANY PERSON WHO IS INFECTED WITH A DISEASE WHICH CAN BE TRANSMITTED BY FOOD TO WORK AS A FOOD HANDLER AS LONG AS THE DISEASE IS IN A COMMUNICABLE STAGE.

It is the responsibility of the employee to inform the license holder or person in charge of such illness. It is the responsibility of the license holder or person in charge to ensure compliance with this requirement and to notify health officials if a disease or outbreak is suspected.

6 B. NORMAL FLORA

People normally carry some bacteria on or in their bodies that can cause foodborne diseases. These are called "normal flora" and most people do not know they are there. For example, on the average, almost two-thirds of the population are carriers of the bacteria that causes Clostridium perfringens food poisoning and one out of every three persons has Staphylococcus aureus in their nasal passages as normal flora. A simple act of touching the nose or blowing the nose is sufficient to contaminate the hands with this important disease-causing bacteria.

6 C. TRANSIENT MICROORGANISMS

Also, there are transient microorganisms that are found on the body, **particularly the hands**, which are picked up during contact with food, utensils and other sources that may be

contaminated. The following illustration depicts how hands can contribute to the contamination of food, utensils, equipment, etc.:

6 D. HANDS

AN IMPORTANT SOURCE OF CONTAMINATION THAT CAN CONTRIBUTE TO FOODBORNE DISEASE OUTBREAKS:

- Hand contaminated from catching a sneeze and scratching the face.
- Cut infected with Staph. aureus.
- Bandage which can harbor bacteria and could become incorporated in food.
- Hand contaminated during visit to the restroom.
- Fingers contaminated from picking the nose and pimple.
- Untrimmed fingernails contaminated because they could not be properly cleaned.
- Jewelry that could contaminate or become incorporated in food.
- Hand contaminated from handling pet prior to coming to work.
- Hand contaminated from handling raw meat.
- Hand contaminated while eating.
- Hand contaminated from using common towel, handling soiled clothing, utensils, equipment, etc.

6 E. WASHING HANDS

Because hands are so important in the transmission of disease organisms, they must be properly washed and washed often. Effective washing can only be accomplished when jewelry is not worn, fingernails are trimmed and adequate handwashing facilities are provided and used.

Handwashing is not effective unless a good lather is built up and all portions of the hands and lower arms are vigorously friction rubbed for **20 to 30 seconds**.

Handwashing can be enhanced by using a fingernail brush, lathering twice, and a post-washing sanitizer dip.

6 F. WHEN TO WASH HANDS

The following list can serve as a guide for when to wash the hands:

- Immediately prior to engaging in food establishment operations;
- After using the toilet;
- Before handling food, clean food-contact surfaces of equipment or utensils;
- After eating, drinking, using tobacco, coughing, sneezing, touching the mouth, touching the nose, or touching the hair;
- After handling raw meat, poultry and seafood when cross-contamination can occur;
- After handling garbage, dirty dishes or soiled equipment;
- After handling personal belongings (street clothing, purses, cosmetics, etc.); and

- At any other time during the work hours as necessary to keep hands clean.

6 G. INJURIES

Injuries on the hands and lower portions of the arms such as cuts, abrasions, burns and even a hangnail must be cleaned and treated immediately. Often these injuries become infected. As a result, they can contribute to the contamination of food and equipment with disease-causing organisms.

Finger and surface bandages also contribute to contamination. Such bandages are commonly lost and become incorporated in food. A recent complaint was a result of a finger bandage being found in a donut (the complaint was made by the attorney of the consumer).

To prevent food and surface contamination from an infected injury or bandage, wear a rubber or plastic glove until the injury is healed.

6 H. OTHER HYGIENIC PRACTICES

In addition to the foregoing personal hygiene considerations, the following good hygienic practices must be observed:

- **Do not smoke, drink or eat in food preparation and dishwashing areas**. Such practices contribute to the contamination of hands, food and food-contact surfaces with saliva that may harbor disease-causing organisms. Have designated areas for employees to take breaks to smoke, drink and eat.
- Do not wash hands in sinks designated for food preparation or equipment and utensil washing. This practice contributes to food and equipment and utensil contamination.
- Do not dry hands on a common towel (towel which can be used repeatedly and by other employees), wiping cloths, apron or clothing. Such practices defeat proper handwashing and result in contamination.

6 I. SUMMARY

- Sick employees and poor hygienic practices rank **SECOND** in the causes of foodborne disease outbreaks.
- Health regulations prohibit persons who are sick with a disease that can be transmitted by food to work as a food handler as long as the illness is in a communicable stage.
- Hands are an important source of contamination that can contribute to foodborne disease outbreaks.
- Hands must be properly washed and washed often to remove disease organisms.
- Wash hands with a good lather and vigorously friction rub for 20 to 30 seconds.
- Hands need to be washed **after using the toilet** and as often as necessary to keep the hands and exposed portions of the arms clean.
- Injuries need to be properly cleaned, treated and protected to prevent contamination.
- **Do not smoke, drink or eat in food preparation and dishwashing areas**.
- Do not use a common towel.

Reference: UNICODE Section 400

SECTION 7 - Equipment and Utensil

Cleaning and Sanitization

The importance of proper cleaning can be appreciated when one realizes that contaminated equipment (equipment and utensils which are not clean) is the **FOURTH** major cause of foodborne disease outbreaks.

Cleaning comprises many operations in the food establishment and the process is usually specific to the type of cleaning necessary. No cleaning task in the food establishment is as important as the cleaning and sanitization of food contact surfaces of equipment and utensils.

7 A. CLEANING FOOD CONTACT SURFACES

Food contact surfaces of equipment and utensils are those surfaces with which food normally comes into contact and those surfaces from which food may drain, drip or splash back onto surfaces normally in contact with food.

Effective cleaning and sanitization of food contact surfaces of equipment and utensils serve two primary purposes:

- Reduces chances for contaminating safe food during processing, preparation, storage and service by physically removing soil and bacteria and other microorganisms; and
- Minimizes the chances of transmitting disease organisms to the consumer by achieving bacteriologically safe eating utensils.

Although we all know about the practice of "washing," many do not understand and/or appreciate the principles and exactness of the process. For the most part, chemistry plays a very important part in the cleaning and sanitization process. Washing equipment and utensils until visibly clean is just not enough.

7 B. WAREWASHING CYCLE

The following numerated list and comments pertaining to the wash cycle of food contact surfaces will help supervisors and managers appreciate why there is a particular order in the process:

1. **Equipment and Utensils Clean Prior to Use.** Properly cleaned and sanitized equipment and utensils should be bacteriologically safe prior to use. Should contamination be suspected, the equipment and/or utensils should not be used, but recleaned and sanitized.

2. **Soiled Equipment and Utensils.** During use, equipment and utensils become soiled and contaminated with bacteria.

3. **Scrapping, Preflushing and Presoaking.** Scrapping, preflushing and presoaking, as necessary, are methods for removing gross amounts and stubborn soil from equipment and utensils.

4. **Cleaning.** There are two steps in the cleaning process - washing and rinsing:

Washing, when using proper detergents, cleaners, chemicals and abrasives, remove the remaining soil from equipment and utensils. This is a physical and a chemical process. The soil and bacteria, as well as cleaning compounds, are suspended in the wash water; and

Rinsing removes most of the suspended soil, bacteria and cleaning compounds from the equipment and utensils. Although the equipment and utensils look visibly clean at this point, they are still contaminated with many bacteria.

5. **Sanitizing.** Sanitizing kills the remaining pathogenic organisms on the equipment and utensils. Sanitization will occur when certain specific chemical concentrations, temperature requirements, time requirements and water conditions are satisfied. These conditions are crucial for effective sanitization. Therefore, precise measurements of the sanitization process are made periodically. **NO RINSING OR ANY OTHER CLEANING PROCESS SHOULD TAKE PLACE AFTER THE SANITIZING PROCESS**.

6. **Air Drying.** The only acceptable method of drying equipment and utensils is air drying. The use of towels for drying, polishing or any other purpose re-contaminates equipment and utensils with bacteria.

7. **Proper Storage and Handling.** Proper storage and handling of cleaned and sanitized equipment and utensils is very important to prevent recontamination prior to use. Cleaned and sanitized equipment and utensils must be:

- stored on clean surfaces; and
- handled to minimize contamination of food contact surfaces.

7 C. SANITIZATION PROCEDURE

Chemical sanitization requires greater controls than hot water sanitization. The following factors must be considered in order to obtain effective sanitization by chemical sanitization methods:

- Amount of water used;
- pH of the water;
- Hardness of the water;
- Temperature of the water; and
- Contact time.

The pH and hardness needs to be determined. Should the water supply be from a municipal supply, the water company may already have this information. If not, the water will need to be tested periodically.

7 D. MANUAL SANITIZATION

The following table provides information pertaining to minimum and maximum chemical sanitization requirements for manual operations (in parts per million - ppm).

Chemical Solutions	Temp (°F)	pH		Maximum Allowed	Contact Time
		≤8.0	≥8.1		
Chlorine	120°	25	25	200	10 sec
	100°	50	50	200	10 sec
	75°	50	100	200	10 sec
	55°	100	100	200	10 sec
≤5.0*					
Iodine	75°+	12.5		25	30 sec
Quats**	75°+	As specified by manufacturer, see label; hardness 500 ppm or less*		200	30 sec

* unless container label specifies a higher pH and/or water hardness limit
** Quaternary ammonium compounds

7 E. OBTAINING PROPER SANITIZATION

All chemical sanitizer instructions call for a given amount of sanitizer per gallon of water. The following two methods of determining the amount of water used for sanitization:

- Use a gallon container and pour a gallon of water at a time into the sink until the water is at a suitable depth; or
- Use the following formula:

$$\frac{\text{width} \times \text{length} \times \text{water depth}}{231 \text{ (cu. in. in one gallon)}} = \text{total gallons}$$

The following will serve as an example:

Length of sink - 24" Width of sink - 24" Depth of sink = 16"

$$\frac{24 \times 24 \times 16}{231} = \frac{9{,}216}{231} = 40 \text{ gallons}$$

- Use the test kit each time and adjust water amount or sanitizer amount until proper concentration is obtained.

In the first two methods, the same amount of water **must** be used each time, unless the amount is recalculated.

Another problem in measuring the right amount of sanitizing chemical is the method of measure stated on the label. The following table provides equivalents of various measurements:

	drops	ml.	tsp.	tbsp.	f.o.
1 ml.	20	-	-	-	-
1 tsp.	60	5	-	-	-
1tbsp.	-	15	3	-	-
1 f.o.	-	-	6	2	-
1 cup	-	-	-	16	8

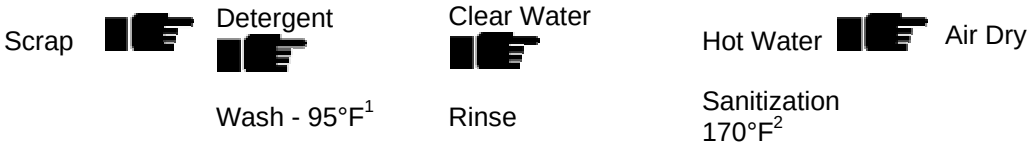
ml. = milliliter tbsp. = tablespoon
tsp. = teaspoon f.o. = fluid ounce

Household bleach is often used as a sanitizer. When used, only pure bleach (without additives) is acceptable. The amounts of bleach (which contains 5.25% sodium hypochlorite) needed to obtain certain concentrations are as follows:

Concentration	Amount of bleach/gallon(s) water
25 ppm	3/4 teaspoon/2 gallons 1 1/2 teaspoons/4 gallons 1 tablespoon/8 gallons
50 ppm	3/4 teaspoon/1 gallon 1 1/2 teaspoons/2 gallons 1 tablespoon/4 gallons 1/4 cup/16 gallons
100 ppm	1 1/2 teaspoons/1 gallon 1 tablespoon/2 gallons 1/2 cup/16 gallons
200 ppm	1 tablespoon/1 gallon 1 cup/16 gallons

7 F. MANUAL WAREWASHING METHODS

Three-Compartment Sink Method (hot water sanitization)



[1] Or as specified on the manufacturer's label
[2] Immersed for at least 30 seconds

Three-Compartment Sink Method (chemical sanitization)

Scrap → Detergent → Wash - 95°F[1] → Clear Water → Rinse → Chemical → Sanitization[2] → Air Dry

[1] Or as specified on the manufacturer's label
[2] According to chemical sanitization schedule

When a two-compartment sink cleaning method is used, a special sanitization formulation must be used in both sink compartments.

7 G. ALTERNATE MANUAL WAREWASHING METHODS

When equipment is too large or fixed for cleaning as specified above, cleaning and sanitization can be done by swabbing or pressure spraying.

Swabbing Method

1. Disassemble;

2. Rough clean to remove gross food particles;

3. Detergent wash with water ≥95°F;

4. Clear water rinse;

5. Chemical sanitize at **TWICE** the strength required; and

6. Air dry.

Pressure Spraying procedure has the same essential steps as swabbing except high pressure spray equipment is used. Follow equipment manufacturer's operating instructions.

7 H. MECHANICAL WAREWASHING METHODS

Mechanical warewashing methods must be according to manufacturer's operating instructions.

7 I. THERMOMETERS AND TEST KITS

Thermometers and/or test kits are required in all food establishments with warewashing operations. The purposes are as follows:

- To confirm sanitizing solution strength and proper water temperature after making for manual warewashing operations;
- To check sanitizing solution strength and water temperature during the warewashing period because the effective strength of the sanitizing solution may be reduced because of the carryover of organic matter and because of a drop in temperature;
- To check water temperature for hot water sanitization; and
- To check proper operation of mechanical warewashing equipment.

7 J. SPECIAL CLEANING AND SANITIZATION

Food processing equipment and some vending equipment that requires in-place cleaning shall be designed and fabricated so that:

1. Washing and sanitizing solutions can be circulated throughout a fixed system using an effective cleaning and sanitizing procedure; and

2. Cleaning and sanitizing solutions will contact all food contact surfaces;

3. The system is self-draining or capable of being completely evacuated; and

4. The procedures utilized result in thorough cleaning of the equipment.

Equipment used in production-line food processing shall be cleaned and sanitized according to the following schedule:

1. Each time there is a change in processing between types of animal products (consider exceptions);

2. Each time there is a change from raw to ready-to-eat foods;

3. After substantial interruptions;

4. Throughout the day as necessary; and

5. After final use each working day.

Bulk water hauling equipment needs to be cleaned and sanitized and the procedure shall be similar to food processing equipment. For specific recommended procedures, see EPA technical bulletin entitled **Guidelines for the Preparation of Tank Trucks for Potable Water Use**.

7 K. SUMMARY

- Contaminated equipment is the **FOURTH** major cause of foodborne disease outbreaks.
- Food contact surface is the surface of equipment and utensils with which food normally comes into contact and those surfaces from which food may drain, drip or splash back onto surfaces normally in contact with food.
- Washing equipment and utensils until visibly clean does not make them clean.

- Proper sanitization is the most important step in the warewashing cycle.
- No rinsing or any other cleaning process should take place after the sanitizing process.
- Equipment and utensils must be air dried only.
- Sanitization procedure is an exact process.
- Swabbing can be utilized when the sanitizing solution is twice the strength required.
- Thermometers and test kits are required.

References: **UNICODE** Sections 500.2 and 13; and 520

SECTION 8 - Water and Sewage Systems

Proper sanitary controls pertaining to the water supply system and sewage and liquid waste disposal systems are necessary in all types of food establishments to prevent the contamination of food and the creation of public health hazards.

8 A. WATER SUPPLY SYSTEM

Water for food establishments is so common place that it is not given much thought as to its availability, purity and safety.

For the most populous parts of Idaho, water is supplied to the food establishment by a community water supply system. However, some establishments in rural areas are on non-community systems. All water supply systems must comply with the following two important regulations:

Idaho Regulations for Public Drinking Water Systems to ensure the purity and safety of the water when it reaches the establishment; and

Uniform Plumbing Code to ensure that the plumbing that carries the water in the establishment is properly sized, installed and maintained.

Despite the protection initially provided through compliance to these two regulations, hazards occur through repairs, emergencies, changes and/or alterations in the water delivery system and distribution system within the establishment. Also, custom water systems, portable water systems, and bottled water operations present particular problems that need special attention.

8 B. CROSS-CONNECTIONS

Of major public health concern in all types of food operations are cross-connections (situations that contribute to backflow and backsiphonage of contaminated water into the safe water supply system). Idaho health agencies find many cross-connections during inspections of food establishments. Examples are as follows:

Hoses connected to faucets without backflow prevention devices is one of the most common cross-connections found in food establishments. The seriousness of this type of cross-connection can be better appreciated with the following three examples of actual Idaho cases of back-siphonage as a result of this practice.

Case #1. Foul tasting and dirty water at a Treasure Valley meat packing plant was the result of backsiphonage through a hose on the floor of the kill room of the plant. Blood, guts and other debris were sucked into the water system through the hose.

Case #2. Backsiphonage through a hose in a wash vat in another Treasure Valley food establishment resulted in chemical sanitizer being sucked out of the vat and carried elsewhere in the water distribution system.

Case #3. In an Idaho Falls operation, while a chemical tank was being filled with water through a hose stuck in the tank, a booster pump was turned on in another part of the facility. Since the booster pump had a greater water demand, the chemicals were backsiphoned from the tank and carried into the water distribution system.

Manual or mechanical spray or injecting units comprised of dishwashing pre-rinse spray units, wash-down stations, power spray cleaning units, dishwashing soap and chemical injecting units, etc. These units connected to the water supply system without a backsiphonage device are potential cross-connections.

Submerged inlets in running water dipper wells, steam tables, garbage grinders and other equipment are cross-connections. In Boise, a submerged inlet in a toilet tank resulted in the toilet tank water being sucked into the water distribution system when the water supply was turned off.

Direct connections between potable water and unsafe water supplies constitute cross-connections. A direct connection between the potable water supply and a boiler in a northern Idaho facility resulted in pink chemical-laden boiler water being carried into the water distribution system and to a water fountain.

Indirect connections such as dishwashing sinks and lavatories in which the faucet inlet does not have an air gap at least twice the diameter of the inlet above the fixture's or equipment's flood level rim.

8 C. WATER SUPPLY SAFETY

With improved water system technology, monitoring and regulatory control, water supplies are safer than ever. However, contamination does occur as a result of system failure or cross-connections. Give special attention to the following:

Water Status Notices. Be alert to public notices that pertain to your water supply. To ensure a safe water supply for food establishment operations and for drinking purposes during such notices, contact your local health department for assistance.

Changes in Water Quality. Be aware of changes in water quality such as taste, odor, or clarity or changes in water pressure. Such changes may be an indicator of a possible cross-connection.

Cross-connections. Check your establishment for cross-connections mentioned above.

Repairs and alterations to the water system or equipment connected to a water system must be done only by a licensed plumber who is familiar with cross-connection prevention.

8 D. SPECIAL WATER SYSTEMS

Because custom water systems, portable water systems and bottled water operations require additional water management outside of the distribution system and can present greater risk to contamination, special requirements for equipment design and protection are necessary. Water haulers, bottled water processors, mobile food establishments and other businesses with such operations or independent water systems should be familiar with additional requirements of the **UNICODE** for protecting the water supply.

8 E. SEWAGE AND LIQUID WASTE DISPOSAL

Sewage is solid or liquid waste containing human, animal, vegetable or chemical matter in suspension or solution.

Liquid waste is the discarded fluid discharge from any fixture, appliance, equipment, utensil, etc. which does not contain human body waste.

Sewage disposal is strongly regulated because many disease organisms are found in human feces. Also, improper disposal of liquid waste contributes to insect, rodent and other pest problems and water pollution.

The septic tank of on-site sewage disposal systems must be pumped regularly to ensure adequate performance. Failure to do so will result in system malfunction which contributes to sewage backup, ponding at the disposal site and/or drainage into a nearby watercourse.

Plumbing for sewage and liquid waste in all types of food establishments must be sized, installed and maintained in accordance with the **Uniform Plumbing Code** and all installations, repairs and alterations must be done only by a licensed plumber.

8 F. DIRECT CONNECTIONS

One of the greatest problems pertaining to sewage and liquid waste disposal in food establishments is **direct connections** between the sewage plumbing system and drains originating from equipment. The following are examples of equipment requiring indirect connections:

- Refrigerators
- Steam kettles
- Potato peelers
- Ice machines and ice storage bins
- Food preparation sinks
- Dipper wells
- Warewashing machines, etc.

All such equipment must have an indirect connection consisting of a physical break in the drain line (it does not require an air gap). The public health significance of this requirement is supported by the following situations:

Patrons of a western Idaho tavern complained about dirty mixed drinks. An investigation revealed that the ice storage bin was directly connected to the drain for the glass washing and dump sinks. Whenever the sinks were drained, the dishwater and waste flowed into the ice storage bin and contaminated the ice.

A rag packed around the dipper well drain line in the sewer hub to prevent the occasional overflow of waste water resulted in the contamination of the dipper well. The situation was found during the investigation of an outbreak in which ice cream was incriminated as the cause. Laboratory tests confirmed that water in the dipper well was grossly contaminated.

An eastern Idaho restaurant operator complained to the health department that the dishwasher often smelled bad. An investigation revealed that a direct connection was allowing sewage to back up the drain line into the dishwasher.

8 G. LIQUID WASTE DISPOSAL

Liquid waste must be properly disposed. Mop water, waste water from equipment cleaning (for equipment that does not have drains), liquid waste water from food preparation, slop, etc., must not be poured out the back door or otherwise be disposed in any manner other than through the sewage disposal system. Utility sinks, floor sinks and the occasional use of the toilet should be used for the disposal of liquid waste. A rural Treasure Valley restaurant created a significant fly breeding problem from the disposal of liquid waste at a convenient place behind the restaurant.

The disposal of mop water and similar liquid waste in food preparation sinks, handwashing facilities and warewashing facilities is not acceptable.

8 H. WASTE WATER SAFETY

Food establishment owners, operators and supervisors must ensure that:

- Sewage and liquid waste generated in their facilities are properly disposed of in an approved sewage disposal system;
- Equipment with drains are not directly connected to the sewer;
- Food preparation sinks (also includes warewashing sinks when the health department allows such facilities to be used for food preparation) are not directly connected to the sewer;
- Modifications and alterations are not made to equipment or drains to create direct connections; and
- Mobile food establishments, temporary food establishments, and vending machine operations have approved liquid waste disposal methods in accordance with the **UNICODE**.

8 I. SUMMARY

- Two important regulations pertaining to water and sewage systems are **Idaho Regulations for Public Drinking Water Systems** and **Uniform Plumbing Code**.
- By regulation, only an Idaho licensed plumber can legally repair and make alterations to the water and/or sewage system in a food establishment.
- Cross-connections are of major public health concern because they contribute to backflow and backsiphonage of contaminated water into the water supply systems.
- Hoses connected to faucets without backflow prevention devices, submerged inlets, and direct connection between potable water and unsafe water supplies are examples of cross-connections.
- Sewage contains human body waste; liquid waste does not.
- Direct connections between the sewage plumbing system and drains originating from equipment are of major public health concern.
- Direct connections can be prevented by a physical break in the drain line.
- Disposing of liquid waste out the back door of a food establishment is not acceptable.
- Idaho examples of cross-connections, submerged inlets, and direct connections confirm their public health risk.

Reference: UNICODE Sections 600.01 and 02

SECTION 9 - Physical Facilities

The physical facilities or structure of a food establishment or operation must be properly designed, constructed, installed, operated and maintained in order to ensure adequate food safety and sanitation. Of the seventeen physical facility areas included in the **UNICODE**, only three areas constitute critical items. They pertain to handwashing facilities, toilet facilities, and the exclusion of pets and other animals. The importance of these areas are covered in this section.

9 A. HANDWASHING FACILITIES

As stated in Section 6, handwashing is essential in combating foodborne diseases. Therefore, sufficient, convenient and adequate handwashing facilities must be provided. Deficiencies in any of these areas constitute public health risk.

Sufficient Handwashing Facilities. This requirement pertains to the number of handwashing facilities and is determined by the following:

- Type of food establishment;
- Food operations within the establishment;
- Size and configuration of the food establishment; and
- The number of employees.

For the most part, the number of handwashing facilities is based on a technical review of proposed plans for new or remodeled food establishments and existing operations coupled with professional judgement, as it pertains to convenience and accessibility.

A long standing operation with insufficient handwashing facilities does not constitute a "grandfather right" for continuance.

Convenient Handwashing Facilities. Handwashing facilities shall be so located to be convenient to the following areas of the food establishment:

- Food preparation area
- Food processing area
- Warewashing area
- Wait person area
- In or adjacent to toilet rooms

Should handwashing facilities not be convenient, additional handwashing facilities may be required.

Handwashing facilities shall be used for handwashing purposes only. The use of the handwashing facilities for storage purposes, dump sink, utensil and equipment washing, food prep or any other purpose makes the facility inconvenient for handwashing purposes and therefore constitutes public health risk.

Restricting easy access (by placing equipment, containers, and other items in front of the handwashing facility), even temporarily, constitutes risk and is considered a critical item violation.

Adequate Handwashing Facilities. Handwashing facilities shall be adequate for the purpose of handwashing. Adequacy pertains to the following design requirements:

- Provided with hot and cold or controlled temperature water (90°F to 105°F) through a mixing valve or combination faucet;
- Self-closing, slow-closing or metering faucets shall provide a continuous flow of water for at least fifteen seconds without reactivating the faucet; and
- Steam mixing valves shall not be used.

In addition, handwashing facilities shall be provided with a continuous supply of:

- Hand soap or similar hand cleanser; and
- Individual disposable sanitary paper towels; or
- A continuous towel system supplied with a clean towel; or
- A heated air hand-drying device.

9 B. TOILET FACILITIES

Toilet facilities shall:

- Be provided;
- Be not less than the number specified in the **Uniform Plumbing Code**;
- Be conveniently located and accessible to employees at all times;
- Be of a sanitary design and cleanable; and
- Be provided with a supply of toilet tissues at each toilet at all times.

9 C. EXCLUSION OF PETS AND OTHER ANIMALS

It is important to understand that pets and other animals harbor disease organisms, both internally and externally, that can be transmitted to humans. For this reason, pets and other animals are excluded from all food establishments. The only exceptions are the following:

- Edible fish or decorative fish, shellfish and crustaceans in an approved life support system;
- Live shellfish and crustaceans on ice or under refrigeration;
- Patrol dogs accompanying security or police officers in offices and dining/sales and storage areas, sentry dogs running loose in outside fence areas, and guide dogs accompanying blind persons in dining/sales areas.

9 D. SUMMARY

- Deficiencies in handwashing facilities constitutes public health risk.
- A long-standing operation without sufficient handwashing facilities does not constitute a "grandfather right" for continuance.
- Handwashing facilities are for handwashing purposes only.
- Placing items in or in front of a handwashing facility is a critical item violation.
- Adequate handwashing facilities consist of hot and cold or controlled temperature water, hand cleaner, and sanitary towels or heated air hand-drying device.
- Toilet facilities must be convenient, accessible and supplied with toilet tissues.
- Except for specific purposes, pets and animals are excluded from all food establishments.

Reference: **UNICODE** Section 700

SECTION 10 - Rodent and Insect Control

All rodents and many insects found in food establishments are considered **vectors** because they can transmit diseases to man by coming in contact with food and food contact surfaces of equipment. Therefore, these animals must be given serious concern when they are found in the food establishments and every action must be taken to eliminate them.

10 A. MICE AND OTHER RODENTS

The **House Mouse** is the most important rodent vector in Idaho. It can be found in almost any food establishment without a good rodent control program. The following comments about the House Mouse is important:

- It can squeeze through a 2 inch diameter hole or 3/8 inch crack;
- It has a home range of 10' to 30';
- It is a nibbler, eating a little bit here and a little bit there until satisfied;
- It contaminates foods, food contact surfaces of equipment and utensils, single-service articles and single-use articles and other supplies in food establishments with its feces and urine;

- It is a prolific breeder, having six or more litters of 6 to 8 young a year; and
- It does not need drinking water to survive.

10 B. RODENT SIGNS

Food establishment operators and supervisors should continually look for the following signs of these rodent pests:

- **Droppings**. Mouse droppings are very small (3/16 to 3/8 inch) and pointed at each end; and
- **Gnawings**. As mice go about their business setting up home in a food establishment, they gnaw holes in packaged food and elsewhere.

10 C. RODENT CONTROL

Food establishment operators must have an effective rodent control program consisting of the following:

- **Sanitation**. Sanitation consists of eliminating unwanted or unused equipment and materials from the establishment, proper storage of food waste and refuse, and keeping packaged food off the floor and away from the walls;
- **Mouseproofing**. Doors need to be tight fitting and openings around pipes, wires, etc., need to be effectively sealed; and
- **Trapping**. Snap traps and cage traps, when properly used, are effective in eliminating mice. Check traps regularly to remove dead mice and/or to reset or to change baits.
- **Poisoning**. Poisoning mice with commercially prepared anticoagulants (poisons with low toxicity) is allowed by the operator when used according to the label. Licensed pest control operators should be consulted for large poisoning campaigns.

Rats are not discussed in this manual because they have a limited distribution in Idaho. However, the above-mentioned control measures are effective against rats.

10 D. FLIES

The public health significance of flies cannot be appreciated until it is realized that flies breed in decomposing animal and plant waste and feed on a variety of filth including feces, vomitus, garbage, etc. Flies transmit disease in the following ways:

- **Vomits on food**. To make solid foods liquid, the fly must regurgitate (vomit) a portion of its previous meal on the food to liquefy it;
- **Defecates on food**. Fly feces on food and food contact surfaces contribute to contamination.
- **Carries bacteria on body**. The fly is profusely covered with bristles and hairs that carry bacteria.

Four common flies and actual Idaho problems associated with them are as follows:

- **House Fly**. This fly is a major problem in all of Idaho, particularly during the hot summer months. A Treasure Valley restaurant created a severe fly breeding problem by dumping liquid waste behind the restaurant.
- **Lesser House Fly**. Where problems of this fly exist, male flies can be commonly seen hovering in groups. A fly problem in an Eastern Idaho restaurant in December was attributed to this fly breeding in food waste behind a piece of equipment.
- **Blow Fly**. This fly is particularly attracted to meats in food establishments and will lay eggs on exposed foods. Maggots (immature flies) in a Treasure Valley restaurant were due to the lack of proper cleaning of meat scraps in a recess behind a cutting board.
- **Fruit Fly**. This small fly is attracted to rotting and fermenting foods. Maggots of this fly were found in a filthy speedbar of a popular Boise lounge.

10 E. FLY CONTROL

Food establishments must have an effective fly control program. The following methods are effective:

- **Exclusion**. All openings to the outside must be properly equipped with self-closing doors, closed windows, proper screening, controlled air currents, etc. Broken or torn screens need to be promptly repaired;
- **Proper Cleaning**. All equipment used in the food operation and all areas of the establishment, especially under and behind equipment, must be properly cleaned of food scraps;
- **Proper Waste Disposal**. Dispose of garbage and liquid waste properly and frequently;
- **Chemical Control**. Certain chemicals can be used in food establishments for fly control provided they are used according to manufacturers' instructions (**as stated on the label**). Be especially careful to not contaminate food or food contact surfaces of utensils and equipment. **NOTE: Automatic spray systems and chemical pest strips can be used provided they are not used in food preparation areas. Pest strips are specifically prohibited in kitchens**;
- **Other Control Methods**. For special fly problems, other control methods such as electrocution screens, fly traps and sticky fly paper can be used. These devices cannot be located over or close to food, food preparation areas or equipment storage areas.

10 F. COCKROACHES

One of the hardest insects to control in food establishments is the cockroach. These insects are active when and where it is dark. When it is light, cockroaches hide in dark recesses between and under equipment, under sinks, in floor drains, etc. Because these areas generally cannot be properly cleaned, these insects come in contact with considerable filth and bacteria.

The **German Cockroach** contributes to most cockroach problems in Idaho. It is a prolific breeder. Females carry their eggs in an egg case on the tip of the tail. The egg cases will be dropped in the best place for their development. Immature German Cockroaches look like miniature replicas of the adults. In a popular Eastern Idaho restaurant, a significant cockroach problem was discovered in stacked taco shells in a food cabinet. In a Treasure Valley grocery store, a severe cockroach problem was found in the produce display and adjacent areas.

10 G. COCKROACH CONTROL

Although sanitation can reduce feeding and breeding sites to some extent, chemical control is almost always necessary to eliminate a cockroach infestation, once established. Most often, the services of a licensed pest control operator will be necessary to control an infestation. Also, repeated treatments will always be required to eliminate the pest completely.

10 H. STORED PRODUCTS PESTS

A number of beetles and several moths are found in food establishments from time to time. These pests are brought into the food establishment with contaminated food products such as flour, meal, grain, cereals, seeds, beans, nuts, pasta, spices, etc. It does not take long for the pests to become so numerous that other similar foods in the establishment are attacked and contaminated. Foods containing these pests are adulterated and unsuitable for human consumption and usually must be destroyed (some can be converted to animal feed). Once established, control can be difficult and only by careful observation for signs of the insects, destruction of contaminated food products and chemical control can these pests be brought under control.

Three stored products pests and actual problems associated with them are as follows:

- **Carpet Beetle**. Despite its name, this small beetle attacks a wide array of food products. A Treasure Valley health food store was selling high protein cereal grossly contaminated with cast skins of the larvae of this beetle. An unknowing consumer of the cereal suffered an inflamed throat from the contamination.
- **Saw-toothed Grain Beetle**. Severe infestations of this minute beetle in a Treasure Valley restaurant and a Panhandle bakery resulted in a considerable amount of food being destroyed at both establishments. A number of infestations of this beetle in markets originated from the damaged food storage area (morgue) where foods are held for credit.
- **Indian Meal Moth**. A severe infestation of this moth in a Palouse Region market was the result of a severe infestation of bulk foods.

Because these pests invade a variety of foods, controlling them is difficult once they become well established. Control generally is successful after a prolonged systematic destruction of infested food products and chemical control.

10 I. SUMMARY

- Rodents and some insects are considered vectors because they can transmit diseases to man.
- The House Mouse is the most important rodent vector in Idaho.
- Rodent control consists of sanitation, mouseproofing, trapping and poisoning.
- Flies transmit disease organisms by vomiting and defecating on food and carrying bacteria on their bodies.
- The House Fly, Lesser House Fly, Blow Fly and Fruit Fly are four flies of public health significance in Idaho food establishments.
- Fly control consists of exclusion, proper cleaning, proper waste disposal and chemical control.
- The German Cockroach contributes to most cockroach problems in Idaho.

- Chemical control is almost always necessary to eliminate a cockroach infestation, once established.
- Control of the Carpet Beetle, Saw-toothed Grain Beetle, Indian Meal Moth is generally successful after a systematic destruction of infested food products and chemical control.

Reference: UNICODE Section 600.04

SECTION 11 - Poisonous Materials

Improper use, storage and/or location, display, and labeling of poisonous and toxic materials, first aid supplies, medicinals and cosmetics presents public health risk due to food and food contact surface contamination.

11 A. EXAMPLES OF HAZARDOUS CONDITIONS

The public health significance of having requirements for this area can be best appreciated with the following examples of potentially hazardous conditions found in Idaho food establishments:

- An aerosol pesticide stored in a discount basket of a retail market with food items in which the spray mechanism had been depressed and the surrounding food containers saturated with the chemical;
- Garden insecticides and herbicides stored above a produce display unit with several of the containers laying on their side;
- Assorted veterinary medicines displayed above a frozen food display case;
- Unapproved insecticide container stored on an ice machine top next to the ice scoop, and in another situation the insecticide container was found in a box of ice storage bags on the ice machine;
- Unlabeled clear cleaner in a spray bottle on the same shelf with plain water in the same type of spray bottle (the water is used to spray on the grill to produce steam while cooking food);
- Pest strip located over a food preparation table; and
- Employee medicine located on a shelf above ready-to-eat food in a refrigeration unit.

Any of the above situations could have resulted in disastrous consequences and only luck prevented serious chemical poisoning or medicinal contamination.

11 B. CHEMICAL AND PESTICIDE USE REQUIREMENTS

All pesticides, sanitizers, cleaners, polishes, lubricants and other toxic chemicals used in a food establishment must be:

- **Necessary** for the operation of the establishment. Unnecessary chemicals should not be found anywhere in the establishment;
- **Approved** for use in the food establishment. Toxic chemicals that have an EPA number on the container will have specific statements pertaining to its use in food establishments.

NOTE: Some products, such as lubricants, may contain statements by the manufacturer as being approved by USDA. Before use, confirm that products are approved for specific use in a food establishment. Restricted-use pesticides can only be used by a certified pest control operator;

- **Used properly** according to the manufacturers' label instructions;
- **Properly labeled** when chemicals are removed from the original container and put into a working container.

NOTE: Food containers must not be used as working containers for chemicals; and

- **Properly stored and located** with insecticides and rodenticides stored separately from cleaning compounds and other chemicals, and **ALL** chemicals and pesticides stored separate from food, food contact surfaces and single-use and single-service articles. The term "separate" does not include storage of toxic chemicals above food, food contact surfaces, single-use and single-service articles.

11 C. CHEMICALS AND PESTICIDES FOR RETAIL SALES

All pesticides, detergents, cleaners, polishes, lubricants, solvents, fuels, paints, etc., in storage and on display for retail sales in a food establishment must be properly stored and displayed. These items must be separated by adequate spacing or partitioning from, and not stored above, food, single-service articles and single-use articles intended for use with food.

11 D. FIRST AID SUPPLIES, MEDICINALS AND COSMETICS

All first aid supplies, medicinals and cosmetics must be stored and displayed in such a manner to prevent contamination. Special consideration needs to be given to the following:

- **First Aid Kits and Supplies** must be properly identified and located away from food, food contact surfaces of equipment and utensils, single-service and single-use articles;
- **Medications**, both human and animal, for retail sales must be properly stored and located as previously mentioned for toxic materials;
- **Medications** vitally necessary for employee use must be stored with personal belongings and/or in designated areas where contamination will not occur; and
- **Cosmetics** for retail sales in food establishments must be properly stored and located as previously mentioned for toxic materials. Personal cosmetics must be stored with personal belongings in designated areas.

11 E. SUMMARY

- Examples of improper use, storage and display of chemicals, pesticides and medicinals reveal that Idaho food establishments can create hazardous conditions.
- Chemicals and pesticides used in a food establishment must be necessary, approved, used properly, properly labeled and properly stored and located.
- All toxic items must be stored and displayed to prevent contamination of food, single-service articles and single-use articles.

- All first aid supplies, medicinals and cosmetics must be stored and displayed to prevent contamination of food, single-service articles and single-use articles.

Reference: **UNICODE** Section 800

SECTION 12 - Think HACCP

With the foregoing sections in mind, a manager or supervisor now has a basic knowledge of food safety and sanitation. Putting this knowledge into practice in a food establishment operation is an activity of **foodborne disease prevention**. Progressive food operations call the activity **HACCP** (pronounced 'ha-sip) and means **H**azard **A**nalysis at **C**ritical **C**ontrol **P**oints.

HACCP began in the late 1960s by Pillsbury Company to meet NASA and US Army standards for reduced levels of pathogens in food. Today, HACCP is recognized as the **most effective process** of preventing foodborne diseases.

12 A. HACCP PROMOTED

Although the **UNICODE** requires **only food processors** to use HACCP, it is recommended that all food establishments use this innovative food safety process in some form. In the 1995 revision of the **UNICODE**, special provisions were provided for implementing HACCP (See **UNICODE** - Appendix B), and HACCP inspections can be included in the inspection process in lieu of the typical regular inspection. Because of current interest in the subject, HACCP information is included in this manual.

12 B. HACCP DEFINED

The two important terms used in defining HACCP are as follows:

- **Hazard** is the unacceptable contamination, survival or growth of microorganisms of concern to food safety, or filth, or spoilage, or unacceptable toxins in food; and
- **Critical control point (CCP)** is an operation (practice, procedure, process or location), or step of an operation, at or by which a preventive measure can be exercised that will eliminate, prevent or minimize a hazard. The most common CCPs are cooking, cooling, reheating, holding, and points of cross-contamination.

12 C. FOUR FUNCTIONS FOR IMPLEMENTING HACCP

There are four functions, consisting of seven components, for implementing HACCP in a food operation. They are as follows (See **UNICODE** - Appendix B):

1. Development of specific written HACCP procedures for all potentially hazardous food products or menu items.

- Develop a flow diagram or chart that identifies the steps in the process from receipt to service.
- Identify the CCPs (see above).
- Establish critical limits for control with each identified CCP (UNICODE requirements).

2. Follow the HACCP procedure at all times.

3. Utilize an in-house monitoring process to ensure that the HACCP plan is adequate.

- Establish procedure to monitor CCPs.
- Establish the corrective action to be taken when monitoring shows that a critical limit has not been met.

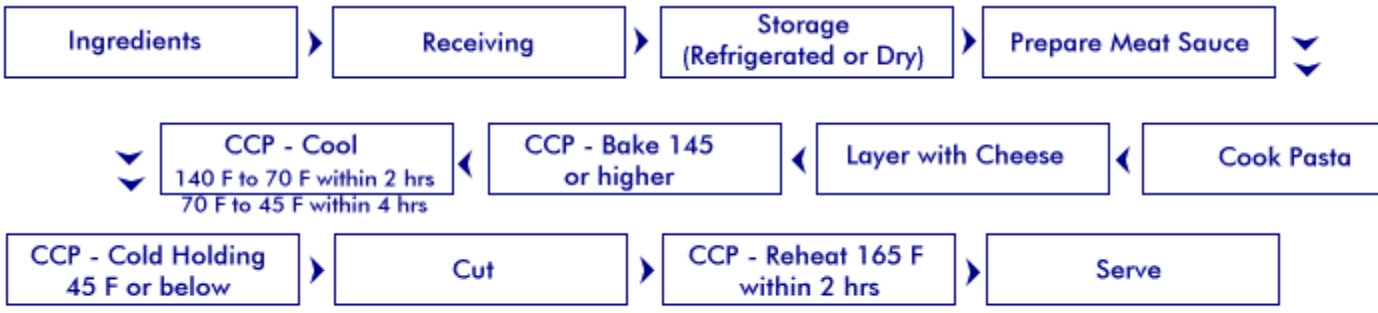
4. Maintain HACCP records.

- Establish procedures to verify that the HACCP system is working.
- Establish a record keeping system.

12 D. FLOW DIAGRAM EXAMPLE

The following is a hypothetical flow diagram for making lasagna. It incorporates all the components of Function #1. The critical limits were obtained from **UNICODE** Sections 300 and 320.

LASAGNA



12 E. TESTING THE HACCP PLAN

Once the flow diagram is complete and each CCP has been considered and the critical limits have been established, it is necessary to test the process to ensure the HACCP plan is adequate. The most important tools for testing the plan (and monitoring) is an accurate **metal-stemmed thermometer and a watch.**

This process will determine if any critical limit has not been met. For example, if the cooling temperature CCP for lasagna is "from any temperature below 140°F to 70°F within two hours" and two hours has lapsed and the temperature is 85°F, the critical limit has been exceeded. As a result, corrective action must be taken. The corrective action may be as simple as decreasing the thickness of the lasagna or relocating the lasagna in the cooling unit where it will cool faster. Whatever the corrective action, it must be identified in writing to ensure that it is followed each and every time.

Once the process has been tested and found that **none** of the CCPs will exceed the critical limits, you are ready to use your plan for the **everyday production** of lasagna. It will be necessary to test each of the plans for the production of all potentially hazardous foods prepared or served by the food establishment. It is very important to **follow the HACCP procedure at all times** (HACCP Function #2).

12 F. MONITORING

An in-house monitoring process (Function #3) is used to ensure that the food being prepared and served was done according to the HACCP plan, in particular, to ensure the CCPs were not exceeded. **Establish the procedure through the utilization of a form.** The form may include the following (compare with the flow diagram example):

- Each CCP for the preparation of lasagna - baking, cooling, cold holding and reheating;
- Critical limit (UNICODE requirement - e.g., reheating to 165°F within two hours);
- Monitoring elements (e.g., baking):
    - What - final baking temperature
    - How - with thermometer
    - Frequency - upon completion of baking
    - Who - the cook; and
- Corrective action - what is to be done should the critical limit not be achieved (example for baking - continue baking until the internal temperature of the lasagna reaches 145°F or higher).

For verification purposes, the form should also include the date, lot or batch numbers (if there is more than one lot or batch of lasagna prepared) and the initials of the person monitoring the process. The form for lasagna can be preprinted and kept on a nearby clipboard for easy recording purposes.

TWO CAUTIONS ARE IN ORDER CONSIDERING MONITORING - (1) Make sure thermometer is accurate - see thermometer calibration procedures on Page 4.3, and (2) avoid marking temperatures on the form without actually checking the temperature - temperature readings must be actual and accurate.

12 G. RECORD KEEPING

Record keeping associated with HACCP procedures ultimately makes the process work. Records are verification to the management, and the health agency, that potentially hazardous foods were properly prepared, cooked, cooled, reheated, etc. In essence, the records represent food safety assurance against foodborne illness.

12 H. CONSIDER HACCP

Regardless of the type of food establishment or the type of foods being prepared or processed, the general process for developing a flow diagram and HACCP plan is the same. The process can be quite simple for some foods or may require more detail than the example provided. However, in all circumstances, the hazards need to be identified and controls need to be specified and checked.

Should your food establishment need assistance in implementing HACCP or need HACCP information, contact your local health agency.

12 I. SUMMARY

- HACCP means Hazard Analysis at Critical Control Points.
- HACCP is recognized as the **most effective process** of preventing foodborne diseases.
- Although the **UNICODE** requires only food processors to use HACCP, it is recommended that all food establishments use it.
- The HACCP process identifies the hazards at each process step from the time the food is received to the point it is served to the consumer and places certain controls to ensure food safety.
- The most important HACCP tools consist of a metal-stemmed thermometer and a watch.
- In the HACCP process, the designated plan must be followed **step by step** to ensure a uniform mechanism for producing safe and quality food.
- Your health agency can assist your food establishment in implementing a HACCP program.

Reference: UNICODE Appendix B

SECTION 13 - Training Employees

As stated in the Forward, the most important purpose of **this publication is to train food establishment supervisors**. It is not designed for other employees of the food establishment, although all levels of the food industry may find it useful. It is the responsibility of the management to ensure that all employees are fully aware of food safety and sanitation practices that are pertinent to their job(s) in the food establishment. It is the purpose of this section to discuss employee training and provide helpful hints for accomplishing this important task.

13A. FOOD ESTABLISHMENT TRAINING CHALLENGE

Based on some national statistics, the average age of an institutional food service worker is less than 25 years old and remains on the job for less than one year. According to a representative of a national restaurant chain, its business "is a 7 billion dollar company run by teenagers...and experiences a 200% turnover rate." The turnover rate of supervisors is quite a bit less. Of course, the statistics vary depending on the type of food industry. Regardless of the numbers, this information suggests that an owner or operator of a food establishment must assume that **training of food workers will be a continual and necessary function.**

Supervisors (or managers) must assume a primary responsibility for food safety and sanitation training in a food establishment. In most cases, supervisors occupy the important position between management and the other employees. His or her role is often to train employees in their tasks and provide ongoing supervision. During this training, food safety and sanitation training should be included.

13 B. TRAINER MUST BE KNOWLEDGEABLE

One of the purposes of the Idaho Food Safety and Sanitation Supervisor Training Program is to help supervisors become knowledgeable about food safety and sanitation matters. A supervisor cannot teach or recognize or monitor food safety and sanitation in the food establishment unless he or she has knowledge about these matters.

This manual is the key for understanding food safety and sanitation. The supervisor who has studied this manual sufficiently knows how to prevent foodborne disease outbreaks. Numerous examples are provided so the supervisor can understand and **appreciate** the public health principles behind certain requirements in which the food establishment is expected to comply. Furthermore, the manual is a resource of materials for training. **It is intended to provide employees with information needed to prevent foodborne disease outbreaks.**

13 C. METHODS OF EMPLOYEE TRAINING

There are various methods for training employees. However, for the purpose of food safety and sanitation training in food establishments, only three methods will be briefly discussed here.

Initial Training. Initial training of employees may be done in groups or one-on-one.

- Group training requires more organization and formal presentation. However, it is an effective method of getting information to employees who have not been previously trained. Your local health department can assist you in organizing training by this method.
- One-on-one training is effective for an employee who is replacing another. Its primary value is that food safety and sanitation information can be tailored to the type of work the employee will be doing. For example, a dishwasher who does not handle food does not necessarily need to be trained in temperature control of food. Training in personal hygiene and dish-washing procedures may be sufficient.

Monitoring and Reinforcing Training. Following training, monitoring the performance of employees will assist the supervisor in determining the effectiveness of the training and where additional emphasis is needed. Watching an employee doing his or her tasks is crucial for

ensuring that the employee has an understanding and is putting to practice proper food safety and sanitation methods.

Continuing Education. Generally food establishments have periodic meetings with employees to discuss operations and other matters. No such meeting should be without some aspect of food safety and sanitation training. The subject is every bit as important as the subject matter for which the meeting was called.

13 D. MANUAL USAGE

This manual is designed for educating the supervisor and to serve as a resource for training other employees. There are various training methods and different training needs for food establishment employees. Therefore, no specified method or agenda is proposed in this manual. It is to be used as the management or supervisor sees fit. The manual is not copyrighted.

13 E. TRAINING ASSISTANCE

Nobody wants your food establishment to succeed in this training effort as much as your health agency. Adequate training will certainly contribute to a better understanding of food safety and sanitation. With this knowledge and with responsible performance, a reduced threat of foodborne disease outbreaks can be assured. In addition, the food establishment will undoubtedly score higher on health department inspections.

Although each food establishment has the primary responsibility for training their employees, your health agency will be happy to provide additional assistance. For information on how your health agency can help you with your training needs, contact your local health department office.

SECTION 14 - What to Do If An Outbreak Occurs

Should a foodborne disease outbreak occur in a food establishment, the impact on the business and its victims can be enormous. This section pertains to what to do if a foodborne disease outbreak strikes your business.

14 A. WHEN TO SUSPECT AN OUTBREAK

From time to time, a food establishment may receive a call from customers who claim that they and/or others ate food at the restaurant or had drinks or consumed food manufactured by a food processor and became sick.

All calls (or visits) should be considered legitimate. Employees should direct all such calls to the manager or person in charge immediately. The following information should be obtained from the caller:

1. Name, address and telephone number of person calling;
2. Who became ill and what were their symptoms;
3. Was the illness diagnosed by a physician (get physician's name if diagnosed);
4. What foods and/or drinks were consumed;
5. What was the day and time the food was consumed;
6. Who was the waitress, bartender or person who served or provided the food, if any; and
7. Other information that may seem important at the time.

Write the information down. Include the date and time the person called. Inform the caller that the complaint will be investigated immediately, and the management will call back within a specified period of time.

The information needs to be promptly evaluated and a decision made on the likelihood that an outbreak has occurred. There are no clear cut guidelines. The best rule of thumb is to **consider that a foodborne disease outbreak may have occurred when two or more persons experience a similar illness, usually gastrointestinal, after eating a common food**.

After giving the matter proper consideration and the management has reason to believe that a foodborne disease outbreak may have occurred, the following contacts are important:

Health Department. Contact your local health department immediately. **UNICODE** Section 400.04 requires notification when a foodborne disease outbreak is suspected.

Your Attorney. Advise your attorney of the situation and the action taken. Although your attorney will most likely recommend that you cooperate fully with the health department, he or she may want to be included in the investigation to ensure that the rights of all concerned are properly respected.

Your Insurance Agent. Depending on the nature and the extent of the outbreak, your insurance company may become involved. It is advisable to inform your agent at the beginning of an official investigation.

14 B. FOODBORNE DISEASE OUTBREAK INVESTIGATION

Once an official foodborne disease outbreak investigation has begun, the management needs to be aware of the following health department activities:

Interviews. Investigating a foodborne disease outbreak is a lot like detective work. Health department staff will be asking a lot of questions, not only of food establishment employees, but also of people who allegedly have become ill. Two fundamental questions need to be answered:

- What food caused the illness; and
- What went wrong to cause the illness.

Isolating the Disease. Depending on the nature of the foodborne disease outbreak, preventing additional cases is paramount. Such control measures that may need to be implemented immediately are as follows:

- Excluding sick employees from food-contact work;
- Using alternate food processing or preparation methods; and/or
- Closing the establishment.

Sampling. Collecting food and environmental samples is an important activity during a foodborne disease outbreak investigation. Finding or not finding the suspected organism or agent in a specific food is significant in determining the cause of the outbreak. Also, it is not uncommon to obtain stool, vomitus and/or blood samples from victims and employees.

Embargo. Suspected foods in foodborne disease outbreak investigations may be placed under embargo until a determination can be made as to its safety or status. Such foods will be properly identified, and the **food must remain undisturbed until the embargo is lifted.**

Reports. Several reports are generated as a result of the investigation. A special inspection report is generally completed during the course of the investigation. It is similar to a regular inspection but only addresses conditions relating to the outbreak. Also, case investigation reports are generated.

14 C. CONSEQUENCE OF THE INVESTIGATION

Health laws and regulations require certain investigations and reporting of foodborne disease outbreaks. The consequence of an investigation is as follows:

- **Determines if a foodborne disease outbreak actually occurred**. Many complaints to the health agencies about possible illness from food consumed at a food establishment are the result of another cause. Also, occasionally the health agency determines that an actual outbreak was not associated with the food establishment;
- **Identifies the factors associated with the outbreak**. The investigation attempts to identify the food that caused the outbreak, why it caused the outbreak, the number of cases associated with the outbreak and other factors. This information contributes to better understanding the outbreak. Also, reports generated from an investigation are submitted to the Idaho Department of Health and Welfare for state and national statistical purposes; and
- **Provides for assisting the food establishment in preventing future outbreaks**. The primary purpose of the investigation is to prevent further illness. With the information obtained from the investigation, the health agency can work with the food establishment in putting additional emphasis on specific food safety and sanitation practices to prevent future outbreaks.